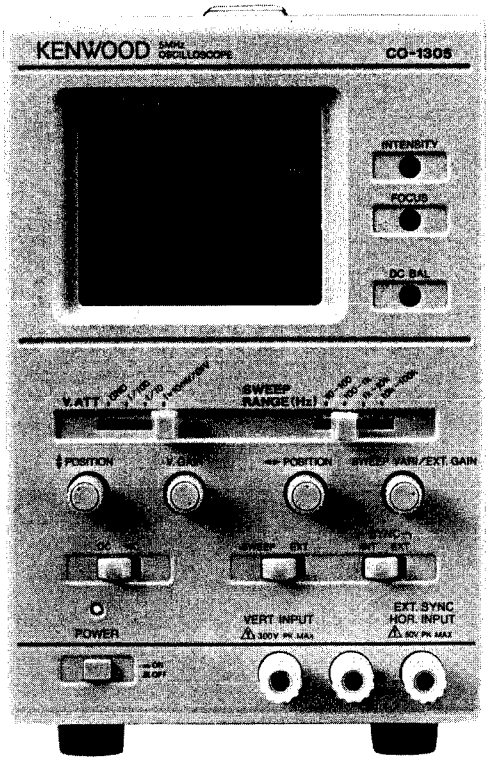
KENWOOD

5 MHz OSCILLOSCOPE

CO-1305

SERVICE MANUAL

KENWOOD CORPORATION



WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

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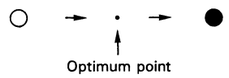
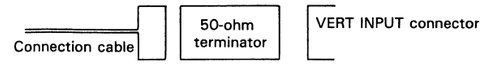
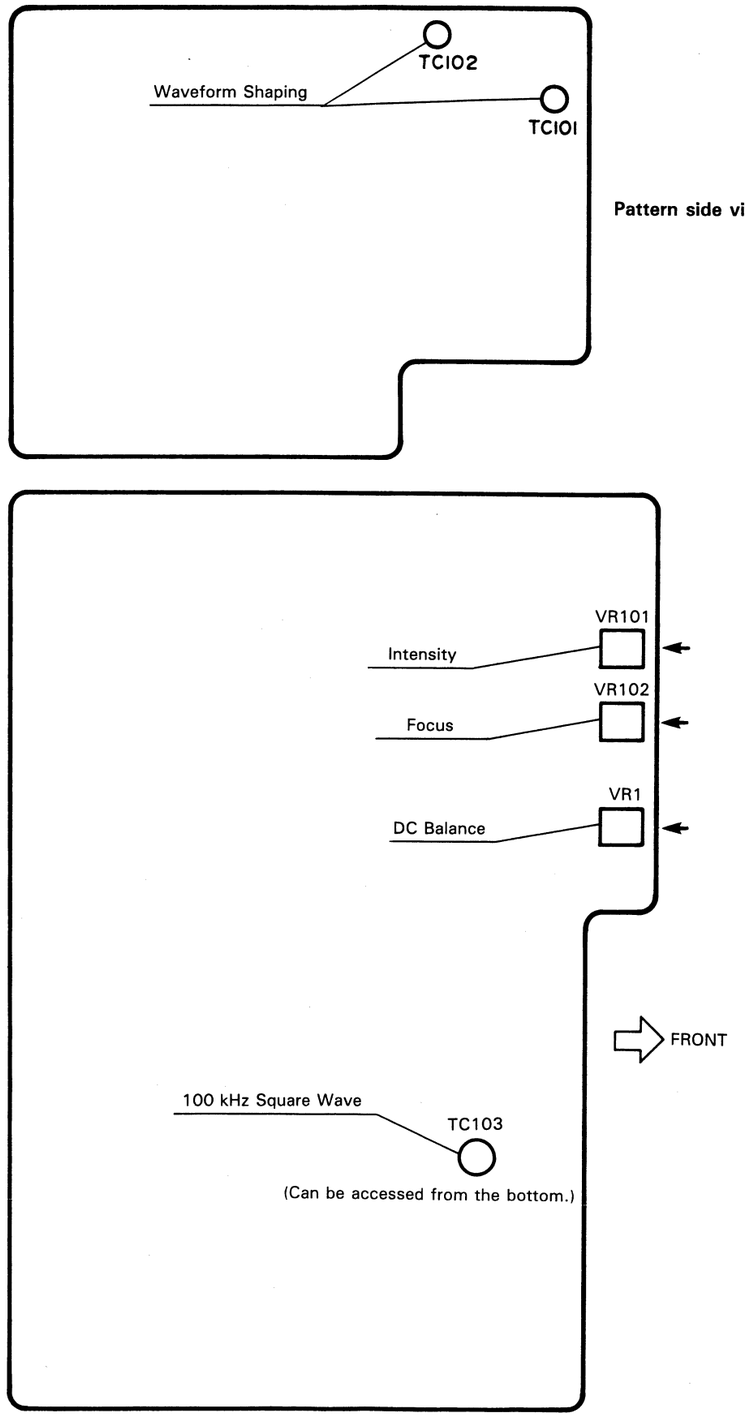
ADJUSTMENT

Item	Adjustment VR (TC)	P. C. B	Procedure
Focus	VR102 (FRONT PANEL)	X65-1450-00	1. Set SWEEP-EXT to EXT. 2. Move the spot to the center of CRT by operating the V.POSI and H.POSI controls. 3. Rotate the FOCUS potentiometer on the front panel with an alignment tool, and confirm that the spot varies as shown in the illustration below.  4. Adjust to position the spot on the optimum point.
Trace Rotation	REAR PANEL		1. Set SWEEP-EXT to SWEEP. 2. Move the spot to the center of CRT by operating the V.POSI and H.POSI controls. 3. Loosen two screws located at the rear, insert a (+) screwdriver into the hole located at the center and adjust so that the illumination line is aligned with the horizontal line. 4. Secure the two screws on the rear panel with a screwdriver, paying attention not to tilt the aligned trace.
DC Balance	VR1 (FRONT PANEL)	X65-1450-00	1. Adjust VR1 with an alignment tool so that the trace does not move when the V.GAIN potentiometer is rotated between MIN ← → MAX with another hand.
Waveform Shaping	TC102 TC101		1. Switch the AC-DC switch to DC. 2. Connect the calibrator cable to the VERT INPUT connector. 3. Set V.ATT to 1 = 10 mV. 4. Switch V.GAIN to MAX. 5. Set the calibrator frequency to 1 kHz, then adjust the GAIN potentiometer so that the trace swings over 6 div. on the CRT. 6. Synchronize the waveform by operating SWEEP VARI so that the waveform comes to an easy-to-observe position. 7. The waveform at this time is assumed as the ideal waveform. Confirm that there is no abnormality with the waveform. 9. Switch V.ATT to 1/10. 10. Adjust the GAIN potentiometer of the calibrator so that the waveform swings over 6 div. on the CRT. 11. Adjust TC102 to obtain an identical waveform to the ideal waveform. 12. Switch V.ATT to 1/100. 13. Adjust the GAIN potentiometer of the calibrator so that the waveform swings over 6 div. on the CRT. 14. Adjust TC101 to obtain an identical waveform to the ideal waveform.

ADJUSTMENT

Item	Adjustment VR (TC)	P. C. B	Procedure
100 kHz Square Wave	TC103	X65-1450-00	(The procedure can be started with the same condition as No. 7.) 1. Set V.ATT to 1 = 10 mV. 2. Connect a 50-ohm terminator to the cable end which is to be connected to the VERT INPUT connector.  3. Set the calibrator frequency to 100 kHz, then adjust the GAIN potentiometer of the calibrator so that the trace swings over 6 div. on the CRT. 4. Switch SWEEP RANGE between 10 k and 100 k, and synchronize the waveform by operating SWEEP VARI so that the waveform comes to an easy-to-observe position. 5. Adjust TC103 to optimize the positive-going section (overshoot) of the square wave. 6. Switch V.ATT to 1/10. 7. Adjust the GAIN potentiometer of the calibrator so that the trace swings over 6 div. on the CRT. 8. Confirm that the positive-going section (overshoot) of the square wave complies with the specification. 9. Switch V.ATT to 1/100. 10. Adjust the GAIN potentiometer of the calibrator so that the trace swings over 6 div. on the CRT. 11. Confirm that the positive-going section (overshoot) of the square wave complies with the specification.

ADJUSTMENT



PARTS LIST

CO-1305

Y71-1190-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	A01-1287-02	CASE
	A10-1479-12	CHASSIS
	A13-0994-03	FRAME
	A22-0899-03	SUB PANEL
	A63-0095-13	MOLDED PANEL ASS'Y
	A63-0096-02	MOLDED PANEL
	B20-0938-04	DIAL SCALE
	B41-2047-04	CAUTION LABEL
	B42-3819-05	SERIAL NO.PLATE
	B42-3820-05	LABEL,SMALL
	B63-0150-00	INSTRUCTION MANUAL;ENG./JAP.
	E21-0678-05	TERMINAL
	E21-0679-05	TERMINAL
	E30-1851-05	POWER CORD ASS'Y(JIS)
	E30-1852-05	POWER CORD ASS'Y(CEE)
	E30-1853-05	POWER CORD ASS'Y(SAA)
	E30-1854-05	POWER CORD ASS'Y(UL/CSA)
	E30-1868-05	POWER CORD ASS'Y(BS)
	F05-2516-05	FUSE(6X32MM) 0.25A/250V
	F05-2518-05	FUSE(5X20MM) T250MA/250V
	F05-5013-05	FUSE(6X32MM) 0.5A/250V
	F20-3006-04	INSULATOR
	G13-0068-04	CUSHION
	H10-2873-02	FOAMED STYRENE PAD,FRONT
	H10-2874-02	FOAMED STYRENE PAD,REAR
	H20-1725-04	VINYL COVER
	H53-0099-04	CARTON BOX
	J02-0363-04	RUBBER FOOT,REAR
	J21-4827-04	BAND,CRT
	J21-4828-04	BRACKET,CRT
	J42-0083-05	BUSHING;FOR 2-CORE AC CORD
	J42-0085-05	BUSHING;FOR 3-CORE AC CORD
	K01-0058-25	HANDLE
	K23-0811-03	KNOB(4 USED)
	K27-0504-04	BUTTON;POWER
	K27-0537-04	KNOB,FOR LEVER SWITCH
	K27-3614-04	KNOB
	L01-9995-15	POWER TRANSFORMER
	N09-0718-05	SCREW,SEMS PAN HD M3X6
	N09-0739-05	SCREW,SEMS BINDING TAPTITE 3X8
	N09-0742-04	SCREW,SEMS PAN HD M3X8
	N09-4508-04	SCREW,SEMS PAN HD M3X14
	N10-2030-41	NUT, HEX M3
	N14-0620-05	FLANGE NUT M4
	N17-1030-41	LOCK WASHER M3
	N30-3010-41	SCREW, PAN HD M3X10
	N33-4014-41	SCREW, OVAL HD M4X14
	N89-3008-41	SCREW, BINDING TAPTITE 3X8
	X65-1450-00	OVERALL UNIT
	75ARB31	CRT
D109	LN322GP	LED

OVERALL UNIT

X65-1450-00

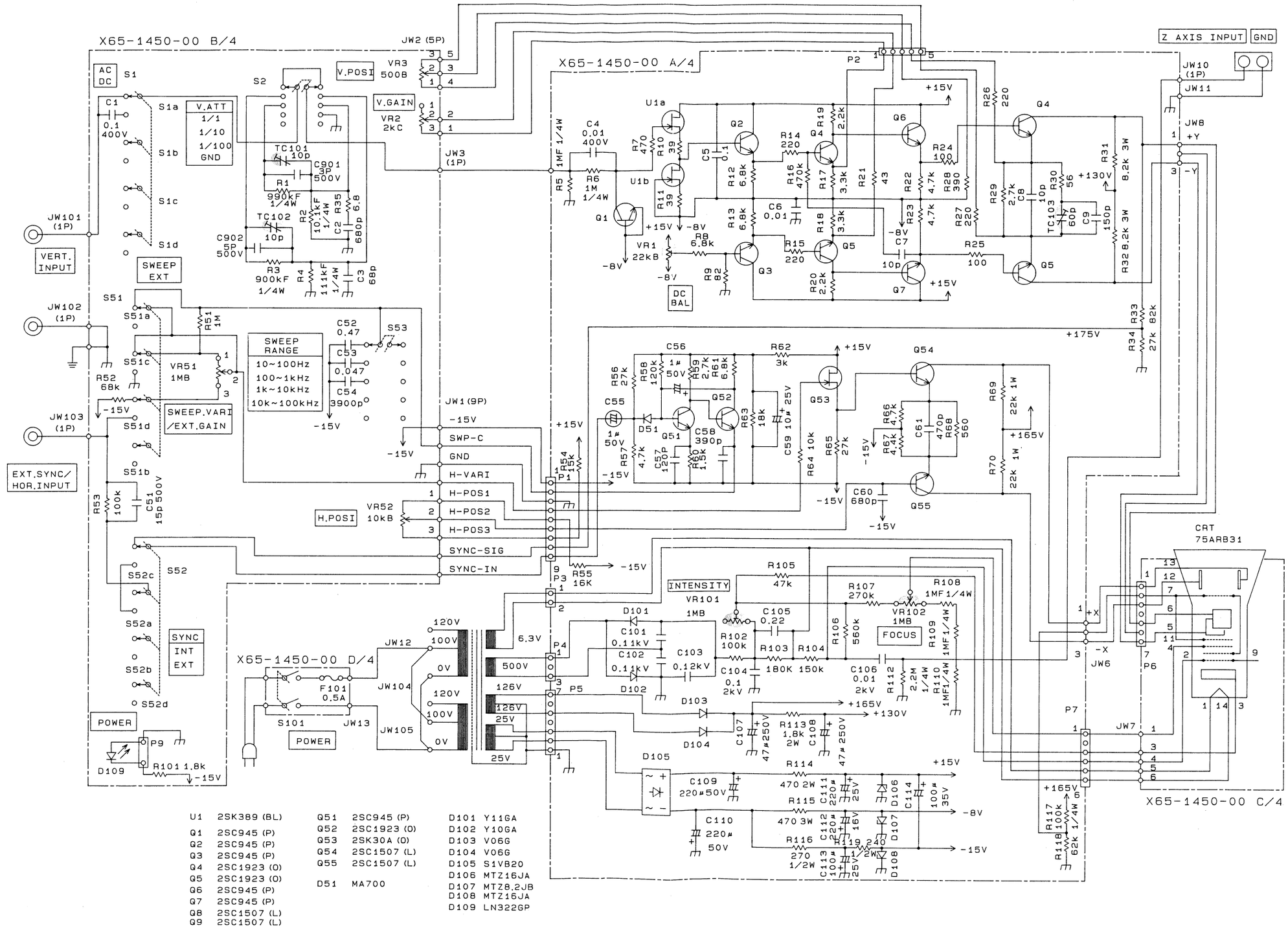
REF.NO	PARTS NO	NAME & DESCRIPTION			
	E01-0103-05	CRT SOCKET			
	E23-0149-05	GND TERMINAL			
	E31-2170-05	JUMPING WIRE			
	J13-0041-05	FUSE HOLDER			
	J73-0235-02	PCB (UNMOUNTED)			
C1	C91-2555-05	CAP. CERAMIC	0.1	10%	400V
C2	CC93FCH1H681J	CAP. CERAMIC	680P	5%	50V
C3	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C4	C91-2556-05	CAP. CERAMIC	0.01	10%	400V
C5	CQ92FM1H104K	CAP. MYLAR	0.1	10%	50V
C6	CK45FB1H103K	CAP. CERAMIC	0.01	10%	50V
C7	CC45FSL1H100D	CAP. CERAMIC	10P	5%	50V
C8	CC45FSL1H100D	CAP. CERAMIC	10P	5%	50V
C9	CC45FCH1H151J	CAP. CERAMIC	150P	5%	50V
C51	CC45SL2H150J	CAP. CERAMIC	15P	5%	500V
C52	CF92FV1H474J	CAP. POLYESTER	0.47	5%	50V
C53	CQ92FM1H473K	CAP. MYLAR	0.047	10%	50V
C54	CQ92FM1H392K	CAP. MYLAR	3900P	10%	50V
C55	CE04HW1H010M	CAP. ELECTRO	1	20%	50V
C56	CE04EW1H010M	CAP. ELECTRO	1	20%	50V
C57	CC45FSL1H121J	CAP. CERAMIC	120P	5%	50V
C58	CC45FCH1H121J	CAP. CERAMIC	120P	5%	50V
C59	CE04EW1E100M	CAP. ELECTRO	10	20%	25V
C60	CC45FSL1H681J	CAP. CERAMIC	680P	5%	50V
C61	CC45FSL1H471J	CAP. CERAMIC	470P	5%	50V
C62	NO USE				
C63	CC45FCH1H271J	CAP. CERAMIC	270P	5%	50V
C101	C91-0506-05	CAP. OIL	0.1	10%	1KV
C102	C91-0506-05	CAP. OIL	0.1	10%	1KV
C103	C91-0509-05	CAP. OIL	0.1	10%	2KV
C104	C91-0509-05	CAP. OIL	0.1	10%	2KV
C105	CF92FV1H224J	CAP. POLYESTER	0.22	5%	50V
C106	C91-0571-05	CAP. CERAMIC	0.01		2KV
C107	CE04W2E470M	CAP. ELECTRO	47	20%	250V
C108	CE04W2E470M	CAP. ELECTRO	47	20%	250V
C109	CE04EW1H221M	CAP. ELECTRO	220	20%	50V
C110	CE04EW1H221M	CAP. ELECTRO	220	20%	50V
C111	CE04EW1E221M	CAP. ELECTRO	220	20%	25V
C112	CE04EW1C221M	CAP. ELECTRO	220	20%	16V
C113	CE04EW1E101M	CAP. ELECTRO	100	20%	25V
C114	CE04EW1V101M	CAP. ELECTRO	100	20%	35V
C901	CC45CH2H030C	CAP. CERAMIC	3P	0.25P	500V
C902	CC45CH2H050C	CAP. CERAMIC	5P	0.25P	500V
D51	MA700	DIODE			
D101	Y10GA	DIODE			
D102	Y10GA	DIODE			
D103	V06G	DIODE			
D104	V06G	DIODE			
D105	S1VB20	DIODE			
D106	MTZ16JA	DIODE, ZENER	15V		
D107	MTZ8.2JB	DIODE, ZENER	8.1V		
D108	MTZ16JA	DIODE, ZENER	15V		
JW1	E38-0725-05	WIRE ASS'Y;PANEL TO MAIN 9P			
JW2	E38-0724-05	WIRE ASS'Y;PANEL TO MAIN 7P			
JW6	E38-0723-15	WIRE ASS'Y;V.H TO CRT			
JW7	E38-0722-05	WIRE ASS'Y;HIGH VOLTAGE TO CRT			
P1	E40-5066-05	PIN CONNECTOR 9P			
P2	E40-3242-05	PIN CONNECTOR 7P			
P3	E40-3237-05	PIN CONNECTOR 2P			
P4	E40-3238-05	PIN CONNECTOR 3P			
P5	E40-3242-05	PIN CONNECTOR 7P			
P6	E40-3242-05	PIN CONNECTOR 7P			
P7	E40-3241-05	PIN CONNECTOR 6P			
P8	E40-0305-05	PIN CONNECTOR 3P			
P9	E40-0218-05	PIN CONNECTOR 2P			
Q1	2SC945(P)	TR. SI, NPN			
Q2	2SC945(P)	TR. SI, NPN			
Q3	2SC945(P)	TR. SI, NPN			
Q4	2SC1923(O)	TR. SI, NPN			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
Q5	2SC1923(O)	TR. SI, NPN			
Q6	2SC945(P)	TR. SI, NPN			
Q7	2SC945(P)	TR. SI, NPN			
Q8	2SC1507(L)	TR. SI, NPN			
Q9	2SC1507(L)	TR. SI, NPN			
Q51	2SC945(P)	TR. SI, NPN			
Q52	2SC1923(O)	TR. SI, NPN			
Q53	2SK30A(O)	FET, N-CHANNEL			
Q54	2SC1507(L)	TR. SI, NPN			
Q55	2SC1507(L)	TR. SI, NPN			
R1	RN14BK2E9903F	RES. METAL FILM	990K	1%	1/4W
R2	RN14BK2E1012F	RES. METAL FILM	10.1K	1%	1/4W
R3	RN14BK2E9003F	RES. METAL FILM	900K	1%	1/4W
R4	RN14BK2E1113F	RES. METAL FILM	111K	1%	1/4W
R5	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R6	RD14BB2E105J	RES. CARBON	1M	5%	1/4W
R7	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R8	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R9	RD14BB2C820J	RES. CARBON	82	5%	1/6W
R10	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R11	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R12	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R13	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R14	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R15	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R16	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R17	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R18	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R19	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R20	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R21	RD14BB2C430J	RES. CARBON	43	5%	1/6W
R22	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R23	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R24	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R25	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R26	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R27	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R28	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R29	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R30	RD14BB2C500J	RES. CARBON	50	5%	1/6W
R31	RS14GB3F562J	RES. METAL FILM	5.6K	5%	3W
R32	RS14GB3F562J	RES. METAL FILM	5.6K	5%	3W
R33	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R34	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R35	RD14BB2C6R3J	RES. CARBON	6.3	5%	1/6W
R51	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R52	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R53	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R54	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R55	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R56	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R57	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R58	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R59	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R60	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R61	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R62	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R63	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R64	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R65	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R66	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R67	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R68	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R69	RS14GB3A223J	RES. METAL FILM	22K	5%	1W
R70	RS14GB3A223J	RES. METAL FILM	22K	5%	1W
R101	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R102	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R103	RD14BB2C184J	RES. CARBON	180K	5%	1/6W
R104	RD14BB2C154J	RES. CARBON	150K	5%	1/6W
R105	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R106	RD14BB2C564J	RES. CARBON	560K	5%	1/6W
R107	RD14BB2C274J	RES. CARBON	270K	5%	1/6W
R108	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R109	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R110	RN14BK2E1004F	RES. METAL FILM	1M	1%	1/4W
R111	NO USE				
R112	RD14BB2E225J	RES. CARBON	2.2M	5%	1/4W
R113	RS14GB3D182J	RES. METAL FILM	1.8K	5%	2W
R114	RS14GB3D471J	RES. METAL FILM	470	5%	2W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R115	RS14GB3F471J	RES. METAL FILM	470	5%	3W
R116	RD14BY2H271J	RES. CARBON	270	5%	1/2W
R117	RD14BB2E104J	RES. CARBON	100K	5%	1/4W
R118	RD14BB2C623J	RES. CARBON	62K	5%	1/6W
R119	RD14BY2H241J	RES. CARBON	240	5%	1/2W
S1	S62-0167-05	SLIDE SWICH			
S2	S62-0166-05	SLIDE SWICH			
S51	S62-0167-05	SLIDE SWICH			
S52	S62-0167-05	SLIDE SWICH			
S53	S62-0166-05	SLIDE SWICH			
S101	S40-2506-05	PUSH SWITCH			
TC101	C05-0404-05	CAP. TRIMMER	10P		
TC102	C05-0404-05	CAP. TRIMMER	10P		
TC103	C05-0456-05	CAP. TRIMMER	60P		
U1	2SK389(BL)	FET, N-CHANNEL			
VR1	R12-3503-05	RES. SEMI FIXED	22KB		
VR2	R01-1521-05	V.R.	2KC		
VR3	R05-0503-05	V.R.	500 B		
VR51	R01-8506-05	V.R.	1MB		
VR52	R05-3522-05	V.R.	10KB		
VR101	R12-8522-05	RES. SEMI FIXED	1MB		
VR102	R12-8522-05	RES. SEMI FIXED	1MB		

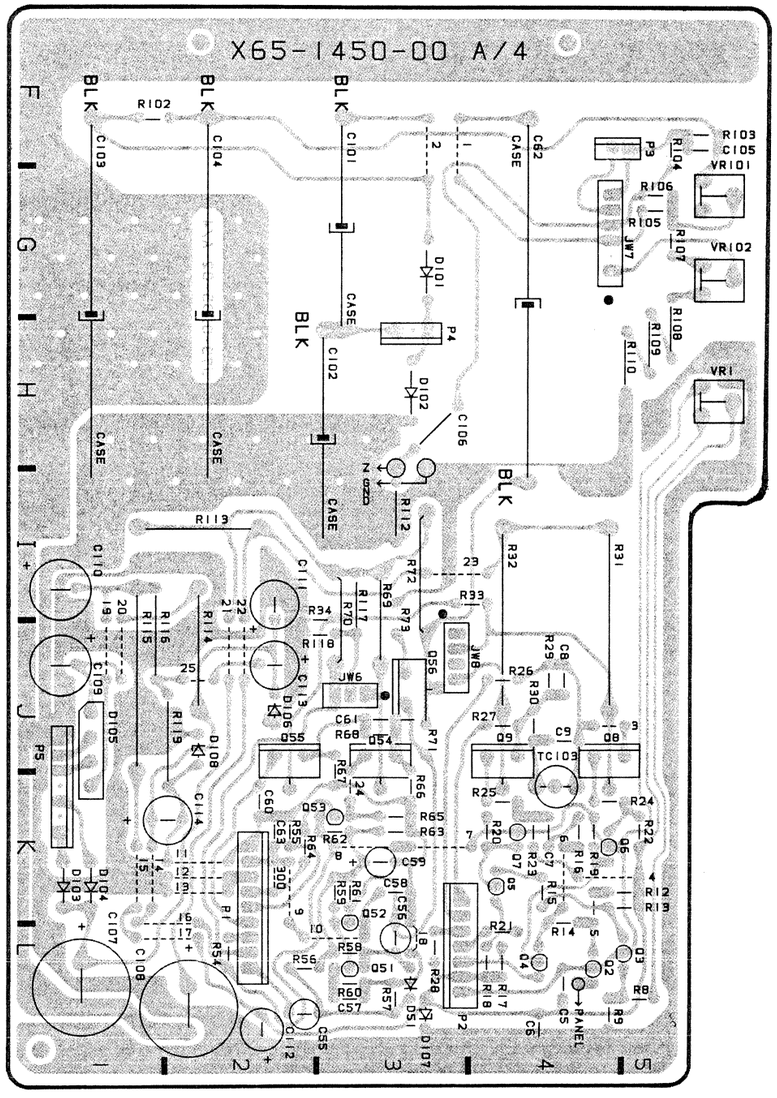
SCHEMATIC DIAGRAM

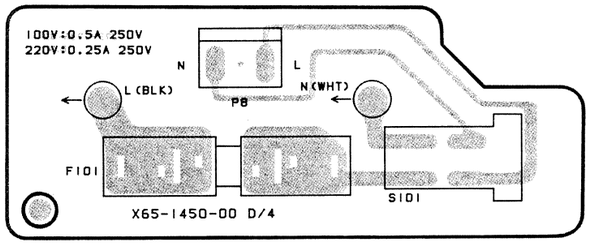


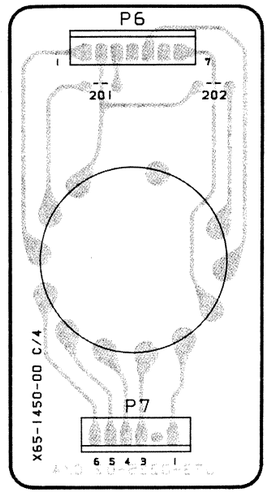
U1	2SK389 (BL)	Q51	2SC945 (P)	D101	Y11GA
Q1	2SC945 (P)	Q52	2SC1923 (O)	D102	Y10GA
Q2	2SC945 (P)	Q53	2SK30A (O)	D103	V06G
Q3	2SC945 (P)	Q54	2SC1507 (L)	D104	V06G
Q4	2SC1923 (O)	Q55	2SC1507 (L)	D105	S1VB20
Q5	2SC1923 (O)			D106	MTZ16JA
Q6	2SC945 (P)	D51	MA700	D107	MTZ8,2JB
Q7	2SC945 (P)			D108	MTZ16JA
Q8	2SC1507 (L)			D109	LN322GP
Q9	2SC1507 (L)				

P.C. BOARD

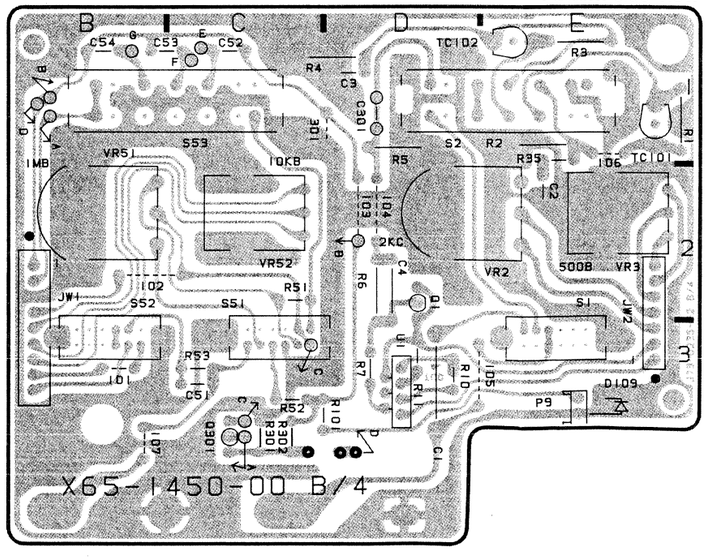
OVERALL UNIT (X65-1450-00)







Pattern side view



A product of
KENWOOD CORPORATION
2-5, 1-chome, Shibuya, Shibuya-ku, Tokyo 150, Japan

B51-1108-00 (MC)